# Luminosity DB: Status and Issues

Ioannis Katsanos
University of Nebraska - Lincoln

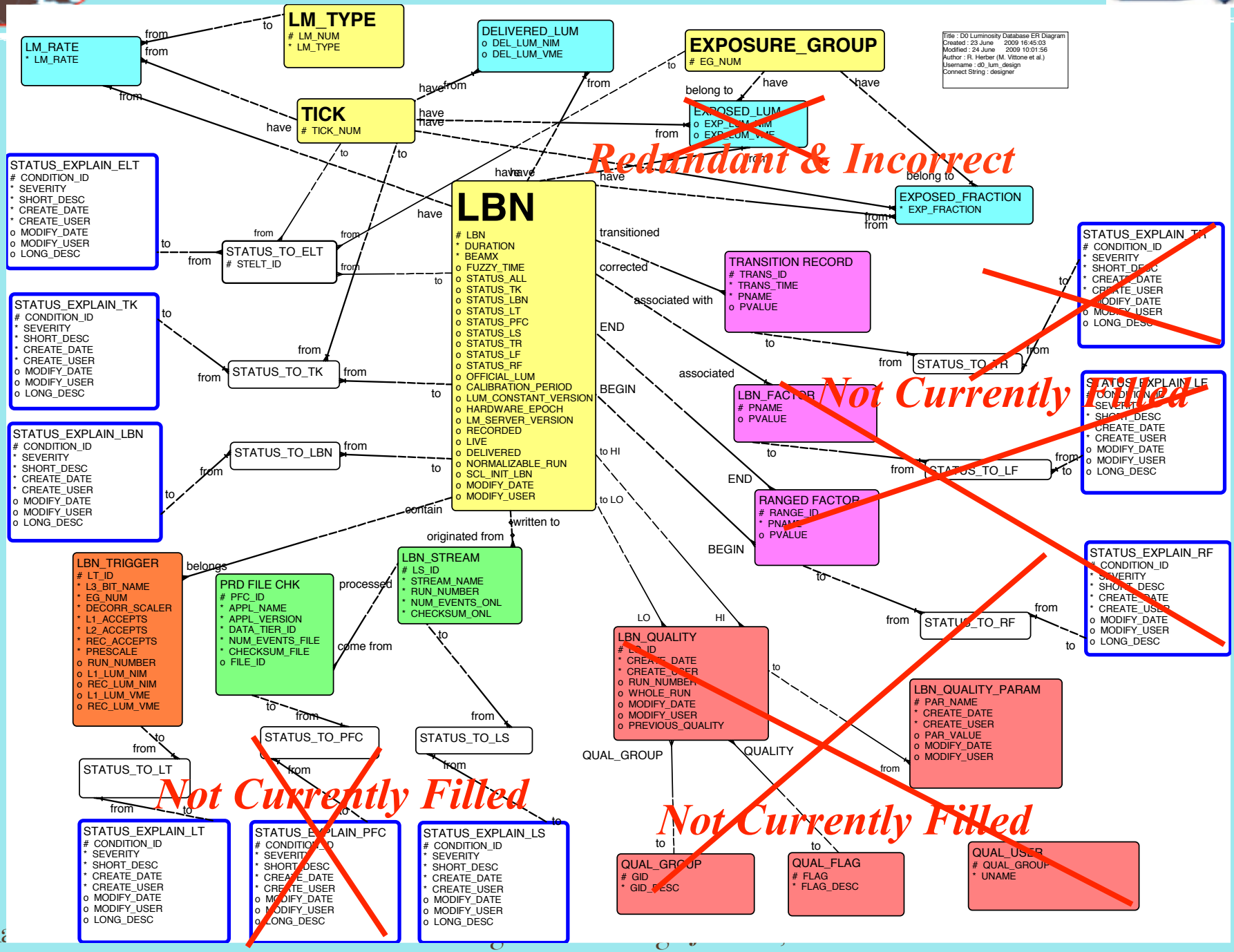
*D0 Taking Stock Meeting - June 17, 2010*

# Lumi DB - Modifications Performed

*Margherita*

- New schema was cut in production DB on November 17, 2009
  - New columns on all LBN records
  - New status values: Recorded, Live, NormRun, Delivered, SCLinit
    - Disambiguate red "LBN Status 23" (catch-all status message)
- Applied scripts to modify ALL LBN rows
    - Filled LBN.FuzzyTime for old LBNs with transition records
    - Filled new status values
- Recently added a new status message

# Lumi DB


LM_TYPE
# LM_NUM
* LM_TYPE
LM_RATE
* LM_RATE
DELIVERED_LUM
o DEL_LUM_NIM
o DEL_LUM_VME
EXPOSURE_GROUP
# EG_NUM
TICK
# TICK_NUM
EXPOSED_LUM
o EXP_LUM_NIM
o EXP_LUM_VME
EXPOSED_FRACTION
* EXP_FRACTION
Redundant & Incorrect
LBN
# LBN
* DURATION
* BEAMX
o FUZZY_TIME
o STATUS_ALL
o STATUS_TK
o STATUS_LBN
o STATUS_LT
o STATUS_PFC
o STATUS_LS
o STATUS_TR
o STATUS_LF
o STATUS_RF
o OFFICIAL_LUM
o CALIBRATION_PERIOD
o LUM_CONSTANT_VERSION
o HARDWARE_EPOCH
o LM_SERVER_VERSION
o RECORDED
o LIVE
o DELIVERED
o NORMALIZABLE_RUN
o SCL_INIT_LBN
o MODIFY_DATE
o MODIFY_USER
STATUS_EXPLAIN_ELT
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_TO_ELT
# STELT_ID
STATUS_EXPLAIN_TK
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_TO_TK
STATUS_EXPLAIN_LBN
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_TO_LBN
TRANSITION RECORD
# TRANS_ID
* TRANS_TIME
* PNAME
o PVALUE
LBN_FACTOR
# PNAME
o PVALUE
RANGED FACTOR
# RANGE_ID
* PNAME
o PVALUE
STATUS_TO_TR
STATUS_TO_LF
STATUS_TO_RF
STATUS_EXPLAIN_TR
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_EXPLAIN_LF
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_EXPLAIN_RF
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
Not Currently Used
LBN_TRIGGER
# LT_ID
* L3_BIT_NAME
* EG_NUM
* DECORR_SCALER
* L1_ACCEPTS
* L2_ACCEPTS
* REC_ACCEPTS
* PRESCALE
o RUN_NUMBER
o L1_LUM_NIM
o REC_LUM_NIM
o L1_LUM_VME
o REC_LUM_VME
PRD FILE CHK
# PFC_ID
* APPL_NAME
* APPL_VERSION
* DATA_TIER_ID
* NUM_EVENTS_FILE
* CHECKSUM_FILE
o FILE_ID
LBN_STREAM
# LS_ID
* STREAM_NAME
* RUN_NUMBER
* NUM_EVENTS_ONL
* CHECKSUM_ONL
STATUS_TO_PFC
STATUS_TO_LS
STATUS_TO_LT
Not Currently Filled
STATUS_EXPLAIN_LT
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_EXPLAIN_PFC
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
STATUS_EXPLAIN_LS
# CONDITION_ID
* SEVERITY
* SHORT_DESC
* CREATE_DATE
* CREATE_USER
o MODIFY_DATE
o MODIFY_USER
o LONG_DESC
LBN_QUALITY
# LQ_ID
* CREATE_DATE
* CREATE_USER
o RUN_NUMBER
o WHOLE_RUN
o MODIFY_DATE
o MODIFY_USER
o PREVIOUS_QUALITY
LBN_QUALITY_PARAM
# PAR_NAME
* CREATE_DATE
* CREATE_USER
o PAR_VALUE
o MODIFY_DATE
o MODIFY_USER
QUAL_GROUP
# GID
* GID_DESC
QUAL_FLAG
# FLAG
* FLAG_DESC
QUAL_USER
# QUAL_GROUP
* UNAME
Not Currently Filled

# Lumi DB - Modifications Performed

*Marco, Jim, Ioannis*

- New luminosity analysis code (lmServer, lmValidator, lumGrabber) was deployed at the same time with new schema (Nov. 17, 2009)
  - Apply, appropriately, new status messages
  - Fill LBN.FuzzyTime for all new LBNs
  - Fill new status values for all new LBNs
  - Same luminosity calculation code between lmServer and lmValidator
  - Use updated Luminosity Constant and background treatment for the luminosity calculation
    - Causes a change of ~1% in the luminosity measurement
    - Needs to to be applied in older data (from June 2006 onwards)
    - Change in background treatment cannot be calculated from information already stored in the DB (just a subset of information produced online

# Lumi DB - REDO: Plans

*Marco, Jim, Ioannis*

- Goal:
  - Reprocess (REDO) all RunIIb data (June 06 onwards, ~2.6M LBNs)
  - Apply new Luminosity Constant and background treatment
  - Fix ~1% of missing and wrong data
  - Use new luminosity software and attach appropriate messages to the LBNs
    - Newer versions of lmValidator and lumGrabber are being under development. Frequent use of Lumi devDB
  - Insert LBNs to the DB
  - Finish REDO this Summer

# Lumi DB - REDO: Till now & immediate future

*Marco, Jim, Ioannis*

- Already finished running lmServer and testing its output
- Next step is to run lmValidator and test its output
  - Estimate ~3 days to prepare outputs and ~1 week of testing
    - Testing will include uploading ranges of LBNs (eg 1 week for every 3 months of data) to the development DB
    - Conduct LBN-by-LBN comparisons with the production DB
    - Compare luminosity calculation from development DB, production DB, and Stage3 files for periods of recent data
  - Waiting for updated lmValidator
- Almost ready to re-load LBNs to the DB

# Lumi DB - REDO: Upload to DB

*Marco, Jim, Ioannis*

- Tests done so far:
  - Load 1 LBN at a time
  - Load 500 LBNs at a time
    - Gained some speed, but more important a large reduction in size of archives
  - Unfortunately, did not use the same LBNs which is a mistake
- Repeat tests over the same LBN. Additionally:
  - Load 1000 LBNs at a time
  - Instead of single deletes ("delete … where lbn=xxx") do multiple deletes ("delete … where lbn >= xxx and lbn <= yyy")
    - Likely a further gain in speed/reduction of archives
- After tests are done, will need a new discussion to decide on a more detailed plan
  - "Would love to gain another factor of 2 in speed but unclear how".

# Lumi DB - REDO: Future

*Marco, Jim, Ioannis*

- Soon after the end of REDO, make production DB available to the collaboration for the luminosity calculation
  - For a period continue producing stage3 files, but restrict access
  - Then turn off production of Stage3 files
  - Then delete them
- In the future we may re-load 2-3 months at a time during the year, until we are done with data taking

# Lumi DB - Web Interface

*Margherita*

- New "Quick Lookup Tool" - very useful for quick access to certain LBN information
- Many additions to the Web interface
  - Plotting of rates by trigger
  - Improved clickable documentation (still need some work to completion)
- Still some open issues
  - Mismatches between online and DB reports - correlation factor, trigger cross-checks
  - Misweb support?

# Other Issues

- Recently, periods of long transactions were reported by DBAs
  - The culprit was identified to a long query ran for every raw data file reconstructed
  - An alternative means of accessing the information needed was provided by Marco
  - Since then the use of the luminosity DB has dropped significantly
- _Old columns
  - Strong preference is to maintain them, as otherwise modification of DBserver used by the farms and subsequently several versions of D0reco will be needed
- lmAccess
  - Need to do final tests to verify correct performance with the final release

# Other Issues

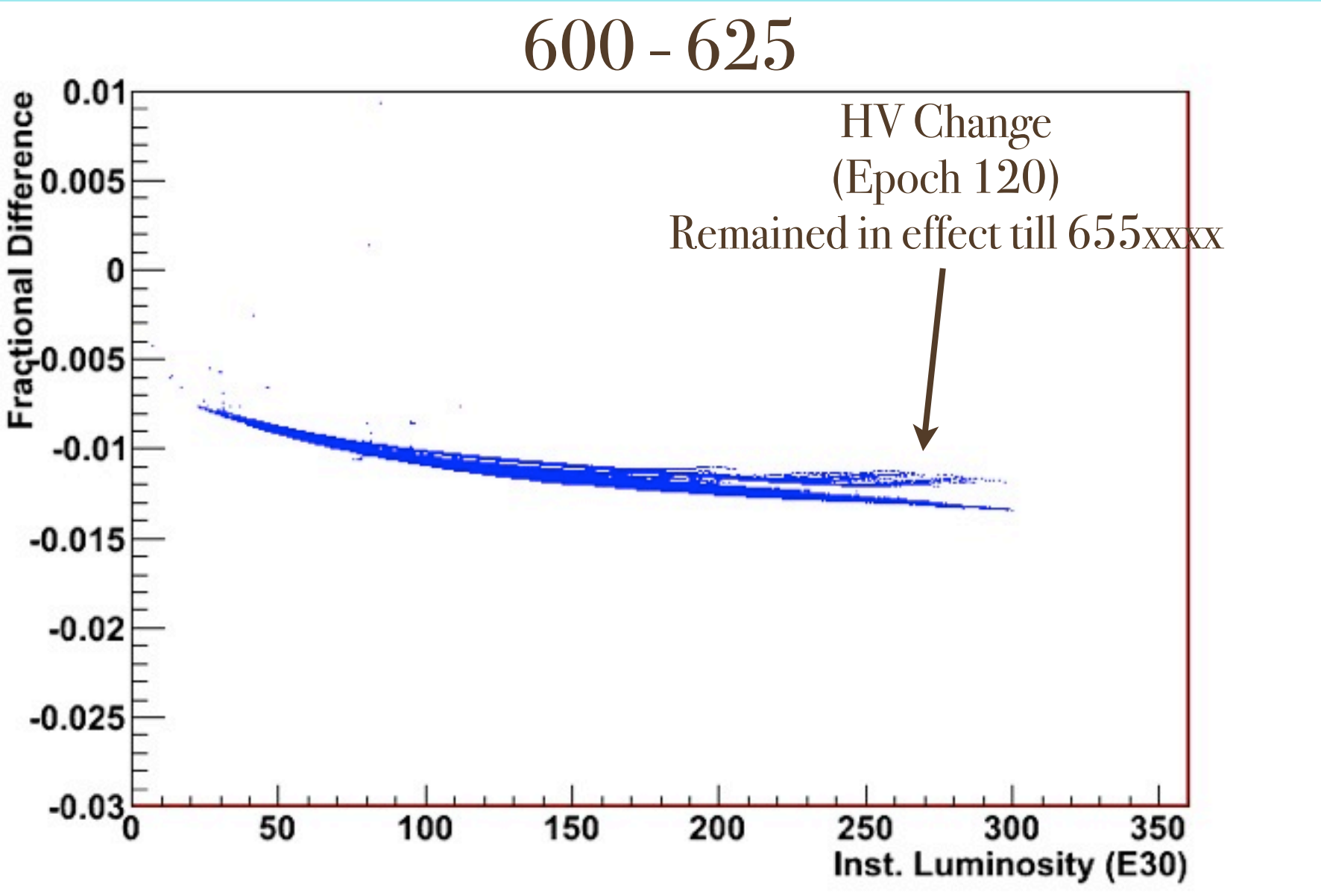
- Integrity checks
  - Margherita performs periodic integrity checks on the DB statistics\
  - Write scripts that perform daily integrity checking on the DB, and the logfiles produced by lumGrabber (*Ioannis*)

# Summary

- Since mid-November 2009
  - new schema is in use at the production DB
  - new luminosity analysis code runs on the online system using the updated RunIIb luminosity constant and background treatment
- A lot of groundwork has been done on the REDO
  - Almost ready for the last stage before being ready to reload production DB and open it to collaboration-wide use

* BACKUP

# 600 Range


600 - 625
HV Change
(Epoch 120)
Remained in effect till 655xxxx
Fractional Difference
0.01
0.005
0
-0.005
-0.01
-0.015
-0.02
-0.025
-0.03
0
50
100
150
200
250
300
350
Inst. Luminosity (E30)

# 675 Range

## 675 - 700